The Biodegradation of Methanol in the Fraser River

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With dwindling oil and gas reserves and an increased urgency to lower vehicle emissions, the quest to find economical and environmentally sound alternative fuels has intensified. Methanol is thought to be a promising alternative fuel for use in fuel cell vehicles and as a gasoline additive. With an increase in demand and consequently, an increase in shipping, storage and distribution facilities, the potential for the release of methanol to the environment is high. In the event of a spill, it is important to understand how the natural environment will respond to the toxin. This study sought to determine the rate and factors contributing to the natural biodegradation of methanol in the Fraser River. Experimental trials were conducted over a period of a year. Initial methanol concentrations added were 1000 mg/L and 10000 mg/L and measured using gas chromatography. Bacterial numbers were also measured using epifluorescence microscopy and the most probable number technique. The rate of uptake of methanol by bacteria was determined using 14C radiolabeled methanol. Results of the trials showed that evaporation played a major role in the loss of methanol. Other contributing factors to the biodegradation rate included temperature, nutrients and competition among other natural flora in the river water.